#	Patent	Source	Fl	Issue Date	Pages	Current Original Classif	trieval Classif	Current Cross Reference	
1	5,256,381	U	T	10/26/1993	11	117/213	117/953	117/216	...
2	5,215,938	U	T	06/01/1993	7	117/100	117/953	117/99	...
3	5,131,975	U	T	07/21/1992	10	117/82	117/953	117/83	...
4	5,124,278	U	T	06/23/1992	12	438/514	117/953	117/103	...
5	5,082,798	U	T	01/21/1992	6	117/89	117/953	117/104	...
6	5,057,287	U	T	10/15/1991	14	117/219	117/953	117/220	...
7	5,047,113	U	T	09/10/1991	7	117/83	117/953	117/223	...
8	4,977,103	U	T	12/11/1990	6	438/507	117/953	117/105	...
9	4,946,544	U	T	08/07/1990	6	117/78	117/953	117/83	...
10	4,923,561	U	T	05/08/1990	9	117/83	117/953	117/900	...
11	4,873,062	U	T	10/10/1989	5	117/215	117/953	117/216	...
12	4,863,877	U	T	09/05/1989	8	438/492	117/953	117/953	...
13	4,832,922	U	T	05/23/1989	13	117/202	117/953	117/217	...
14	4,824,520	U	T	04/25/1989	8	117/3	117/953	117/59	...
15	4,196,171	U	T	04/01/1980	5	117/209	117/953	117/900	...
16	3,649,192	U	T	03/14/1972	5	117/77	117/82	23/294R	...
17	3,353,912	U	T	11/21/1967	6	117/77	117/82	117/79	...
18	3,344,002	U	T	09/26/1967	9	117/87	117/953	117/105	...

US PAT NO: 5,18[redacted]784 :IMAGE AVAILABLE: [redacted] L7: 19 of 51

ABSTRACT:
Doping of IIIB-VB semiconductor crystals grown by the liquid encapsulated Cyochralski techniques is improved by introducing a metal to the crucible. The metal is characterized as having a lower melting temperature and a lower free energy of oxide formation than the dopant element.

US PAT NO: 5,182,149 :IMAGE AVAILABLE: L7: 20 of 51

ABSTRACT:
A pyrolytic boron nitride boat having a cavity suitable for use in growing and doping semi-conductor crystals such as gallium arsenide and said cavity having a roughened surface formed of substantially uniform projected no nodules, disturbances, or ridges.

=> d his

(FILE 'USPAT' ENTERED AT 11:58:50 ON 31 DEC 1997)

L1	395081	S	CARBON
L2	2000	S	POWDER (1W) CARBON
L3	14107	S	GAAS
L4	1	S	L2 AND L3
L5	165	S	L3 AND LEC
L6	0	S	L5 AND L2
L7	51	S	L5 AND L1

=> d l7 1,14,18,19,20 ab

US PAT NO: 5,685,907 :IMAGE AVAILABLE: L7: 1 of 51

ABSTRACT:

A method and apparatus for the preparation of single crystals of group II-VI compounds such as ZnSe and CdTe and group III-V compounds such as InP and GaP or of ternary compounds thereof, from which some of their components are likely to be dissociated and evaporated during crystal growth at high temperatures. Single crystals are prepared which enable the preparation of high quality compound single crystals and prevent the contamination of furnace structures. The method includes melting a source material in a container by heating in a furnace body and solidifying the melt by cooling from the bottom to grow a single crystal. The container is enclosed by an airtight chamber communicating to the outside with a pressure equalizing passage. Heating is performed while the passage is held at a low temperature equal to or lower than the melting point of a high-dissociation-pressure component of the source material. The apparatus includes a container for holding the source material, a hermetical furnace body including a heater to heat the container, an airtight chamber inside the heater which encloses the container and a pressure equalizing passage communicating with the airtight chamber and forming a lower portion of the chamber.

US PAT NO: 5,259,916 :IMAGE AVAILABLE: L7: 14 of 51

ABSTRACT:
Doping of IIIB-VB semiconductor crystals grown by the liquid encapsulated Czochralski techniques is improved by introducing a metal to the crucible. The metal is characterized as having a lower melting temperature and a lower free energy of oxide formation than the dopant element.

US PAT NO: 5,229,637 :IMAGE AVAILABLE: L7: 18 of 51

ABSTRACT:
In a semiconductor device constituting a **GaAs** MESFET, a **GaAs** substrate is prepared from a base material containing boron ions as a dopant impurity having a total impurity concentration of 2.times.10.sup.17 atoms/cm.sup.3 or more. The boron ions are introduced into the **GaAs** substrate during crystal growth so that a uniform distribution of boron ions in the substrate results. Electrode layers are formed at predetermined portions on the **GaAs** substrate, and an active layer is formed to be adjacent to the electrode layers by ion implantation. Source and drain electrodes are formed on the electrode layers respectively, and a gate electrode is formed on the active layer.

=> d l5 ab

US PAT NO: 4,632,710 :IMAGE AVAILABLE: L5: 1 of 1

ABSTRACT:
An epitaxially grown high resistivity crystalline layer of gallium arsenide is produced in a reactor vessel with a predetermined amount of carbon dioxide introduced during growth of the high resistivity gallium arsenide (**GaAs**) crystalline layer to provide carbon as a dopant. Thus, a plurality of carbon atoms is provided in the crystal, such carbon atoms having electrons at energy levels between a valance energy band and a conduction energy band of the **GaAs** crystal. With these energy levels, the carbon atoms are substantially ionized at room temperature by accepting a plurality of electrons from the valance band of the **GaAs**. The presence of these carbon ions in the crystal compensates for a stoichiometric defect which occurs during epitaxial growth of the **GaAs** crystalline layer. This results in a high resistivity layer which provides a buffer layer between a **GaAs** substrate and an active **GaAs** layer. Further, by introducing carbon in the form of carbon dioxide, oxygen released during reduction of the carbon dioxide by reacting the carbon dioxide with hydrogen during the doping of the **GaAs** produces water. The water reduces the concentration of unwanted silicon oxide material generally introduced by the reactor vessel and contaminants and which is associated with unwanted background donor doping of the **GaAs**. By reducing the concentration of silicon oxide, the concentration of stoichiometric defects becomes the principle donor source, thus enabling optimum compensation thereof with carbon doping.

=> d his

(FILE 'USPAT' ENTERED AT 08:45:23 ON 31 DEC 1997)

L1	14107	S	GAAS
L2	181	S	CARBON (1W) DOPED
L3	48	S	L1 AND L2
L4	3269	S	BORON OXIDE
L5	1	S	L3 AND L4

5515410 9

=> d his

(FILE 'USPAT' ENTERED AT 08:45:23 ON 31 DEC 1997)
L1 14107 S GAAS
L2 181 S CARBON (1W) DOPED
L3 48 S L1 AND L2
L4 3269 S BORON OXIDE
L5 1 S L3 AND L4

=> d l3 9 ab

US PAT NO: 5,515,810 :IMAGE AVAILABLE: L3: 9 of 48

ABSTRACT:
To manufacture a low-carbon concentration **GaAs** wafer required for devices such as hall sensors, FETs, HEMTs etc. at a high production yield without deteriorating the semi-insulation characteristics thereof, a method of manufacturing a semi-insulation **GaAs** monocrystal by controlling carbon concentration during crystal growth by a simple method is disclosed. The method of manufacturing a semi-insulation **GaAs** monocrystal in accordance with liquid encapsulated Czochralski method, comprises the steps of: preparing a crucible (5) formed with a crucible body (6) and a small chamber (8) communicating with a lower part of the crucible body and a carbon heater (4) processed to reduce surface blow holes thereof; putting a melted **GaAs** liquid and a sealing compound B.sub.2 O.sub.3 in the crucible housed in an airtight vessel in such a way that the sealing compound B.sub.2 O.sub.3 is on the melted **GaAs** liquid and further the melted **GaAs** liquid put in the small chamber contains carbon to be supplied to the melted **GaAs** liquid in the crucible body; heating the crucible by the heater housed in the airtight vessel; and pulling up the melted **GaAs** liquid from the crucible body by keeping the airtight vessel at a high pressure.